



SEMS DocID 2330195

RECEIVED

3

MAR 12 1981

## MEMORANDUM

## WATER SUPPLY

TO : Robert J. Touhey

March 10, 1981

THRU: Michael A. Apgar *MAA*FROM: Lisa A. Hamilton *LAH*

RE : Pigeon Point Landfill and ICI wells

In June 1977, [redacted] conducted an "investigation of the hydrologic connection between a contaminated zone at the Pigeon Point Landfill and a well belonging to ICI United States, Inc.". In this investigation, [redacted] found that well 28 at the Pigeon Point Landfill (a Potomac well, 50 ft. deep; contaminated with Pb in an Open Dump Inventory sample) was most likely not hydrologically connected with ICI's well 11 (a Potomac well, 100 ft. deep). [redacted] memo is attached.

Since that time, more wells have been installed at the Pigeon Point Landfill. The deepest new well, 41A, was found to be contaminated with Pb in an Open Dump Inventory sample. Well 41A is approximately 55 ft. deep. We could do an investigation similar to [redacted] to determine if well 41A is hydrologically connected with ICI's well 11. However, chances are that the results would be the same (wells not hydrologically connected) since well 28 and well 41A are of similar depths, are in the same formation and are about 800 ft. apart.

Another alternative is to sample ICI's wells and run a heavy metals series on the samples. Since all of ICI's wells are deeper than the wells at Pigeon Point, it would be difficult to determine if any metals found in ICI's wells actually came from contamination caused by the landfill. Another problem we may encounter is the possibility of ground water contaminated by disposal practices at duPont's Chambers Works, being drawn under the Delaware River and into ICI's wells.

Deeper wells are needed at the Pigeon Point landfill to fully investigate the potential for contamination of ICI's wells by the landfill.

/tj

Attachment

cc: Kenneth R. Weiss

ORIGINAL  
(Red)*RJT**I agree with both*

*conclusions that while the existing Pigeon Pt monitoring wells are not in contact with the ICI production well zone, the IF could contaminate the ICI wells if the leachate moves deeper. — deeper monitor wells at the IF are the only way to answer this matter*

*MAA 3/12/81*

M E M O R A N D U M

TO: File

DATE: June 21, 1977

FROM: non responsive based on revised scope

SUBJECT: Investigation of the hydrologic connection between a contaminated zone at Pigeon Point landfill and a well belonging to ICI United States, Inc.

---

BACKGROUND

This memo is to document and summarize my investigation into the potential for contamination of the wells of ICI United States by leachate from the Pigeon Point landfill. Tracing individual sand units from well logs appeared very difficult because of the discontinuous nature of the fluvial sediments in the area. Also, we recognized that two sands laterally adjacent, even though they may not be the same sand, may be hydrologically connected. Therefore, we decided that the best way to determine if the ICI wells were connected with the contaminated zones at Pigeon Point was to see if the water level in a well at Pigeon Point responded to pumpage of the ICI wells. ORIGINAL (Red)

MONITORING OF WATER LEVELS IN PIGEON POINT WELL 28

We chose to monitor the water level in Pigeon Point well #28 because it was between ICI and the landfill, it was screened in what Glenn Elliott of Richardson Assoc. called the "lower sand", and it was said that the sand it was screened in was relatively clean so that it should respond to water level changes in the aquifer.

MEMO TO FILE  
June 21, 1977  
Page two

Four weeks of continuous water level measurements were collected as shown on the attached charts. I informed [redacted] Sanitary Engineer for ICI, what we were doing and asked him for records of when their wells went on and off so that I could see if water level changes at the landfill seemed to correlate with the times that ICI pumps turned on or off. If so, it would appear that the landfill and the ICI wells are hydrologically connected with the zone screened in the ICI well(s). The pumping data [redacted] supplied me is attached. Although the landfill well's water level did respond to tidal fluctuations, it did not respond to ICI's wells going on and off. However, there were several difficulties. First, there were several times when the water level change did not appear to be due to tides but ICI did not have any pumping records for any of those times. Also, the pumping records showed that, except for the pumps that ran continuously, the pumps that came on usually were not on for more than an hour and often less than that. Therefore, the short pumping times would probably not be long enough to cause a change in water level over the relatively long distance to the landfill.

ORIGINAL  
(Red)

Due to these problems, I then wrote a letter to Mr. [redacted] Sanitary Group Supervisor for ICI, telling him that we would like to run a pump test in cooperation with ICI to pump one of the shallow production wells for at least 24 hours and to observe water level changes in well 28 at Pigeon Point landfill. [redacted] responded for Mr. [redacted] that they were going to have a maintenance shutdown at the plant and would like to arrange the test. With [redacted] help, the test was arranged and ICI well 11 was pumped at 500 gpm for 46 hours. ICI well 8 was used as an observation well as well as Pigeon Point well 28.

### RESULTS

A good drawdown curve was obtained at well 8. From it, the transmissivity was calculated to be 38,200 gpd/ft and the storage coefficient is .00028.

From the transmissivity, storage coefficient, and distance from the pumping well, I calculated that the drawdown in well 28 should have been 4.12 feet at the end of the pump test, if both wells were in the same hydrologic unit. Since the water level declined only 0.135 feet after the pumping started, this indicated that the screened intervals of wells 11 and 28 are not well connected.

The well 28 water level recorder chart shows a series of water level fluctuations, both cyclical tidal fluctuations and some other fluctuations. I have plotted the elevations of the tides with time over the water levels with time. There is a definite correlation between each high and low tide but there seems to be no correlation, such as abnormally high or low tides, to explain the water level fluctuations other than the twice-a-day tides. There was a water level decline about 12 to 14 hours after well 11 began pumping. However, the water level began to rise before the pump was shut off. Beginning about 6 hours after the pump was shut off, there was a water level rise, but the water levels dropped and rose in a similar way from the 24th through the 27th when no pump test was being run. I began to suspect that the water level decline and recovery was not due to the pump test but was due to something else. When I plotted the mean daily barometric pressures for the time of interest, a pattern emerged (see the recorder chart). When the barometric pressure dropped and rose, the water level in well 28 rose and fell, respectively. The barometric efficiency was calculated from the ratio of the water level change in the well

ORIGINAL  
(Red)

MEMO TO FILE  
June 21, 1977  
Page four

to the tidal level changes. Using this BE, the change in water level that should be due to atmospheric pressure was calculated. The water level dropped 0.135 feet after pumping began. The water level drop due to the barometric pressure change was calculated to be 0.12 feet. Therefore, it appears that essentially all the water level decline (and recovery) was due to atmospheric pressure changes and not due to drawdown caused by pumping ICI well 11. The same calculation done for well 28 water level and barometric data from 4-22-76 to 4-30-76 confirmed that a water level fluctuation was entirely due to atmospheric pressure change.

#### CONCLUSIONS

The conclusions of this work are that ICI well 11 does not appear to be hydrologically connected to the contaminated zone screened in Pigeon Point well 28. However, this does not necessarily mean that there is no potential for the landfill to contaminate ICI's wells. Since well 28 is about 50 feet deep and well 11 is about 100 feet deep, well 11 may be hydrologically connected to a deeper zone beneath the landfill. If that deeper zone is contaminated by the landfill, then there could be a potential to contaminate the ICI shallow wells. However, at the present time we do not know if the landfill contamination extends deeper than 50 feet or if any deeper zones beneath the landfill are hydrologically connected to ICI's wells.

If ICI drills a well adjacent to the landfill into the lower Potomac aquifer, we should use that well as an opportunity to learn something about the deeper sediments under the landfill.

/jm

ORIGINAL  
(Red)